7 Repair information on Mechanical System

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7.1 Housing

The housing is made of PU foam. The necessary insert nuts are foamed.

7.1.1 Repair/exchange of housing

7.1.1.1 Housing

For housing repairs adhesive "UHU Plus Endfest 300", DW-part-no. 11 95 255 is permitted.

7.1.1.2 Exchange of Housing

When the housing is exchanged always the latest modification state of the housing has to be used. After the exchange the fresh air intake has to be readjusted (see 7.1.2).

7.1.2 Fresh air intake

A functional check of the fresh air intake is always required when:

a) the 02-concentration in the incubator is not reached during external supply.

b) the basic housing is replaced.

Calibration is made possible by changing the cross section in the intake channel behind the fresh air filters by turning of the setting screw.

7.1.2.1 Calibration

Condition:
- new fresh air filters
- sealing in the fresh air intake between unit and basic housing has to tighten.
- canopy must not have additional ports.

Via a metering valve supply 7.5 + 0.5 L/min oxygen at a system frequency of 50 Hz or 9.0 + 0.5 L/min oxygen at a system frequency of 60 Hz through the nozzle for external oxygen supply to the incubator. By means of the setting screw behind the fresh air filter set oxygen concentration, measured with a O2 monitor, e. g. Oxydig, middle of lying surface in height of 10 cm, to 40 + 2 vol. by %.
Afterwards monitor oxygen concentration for at least two hours and correct setting, if necessary.

7.2 Incubator hood

7.2.1 Hood repair

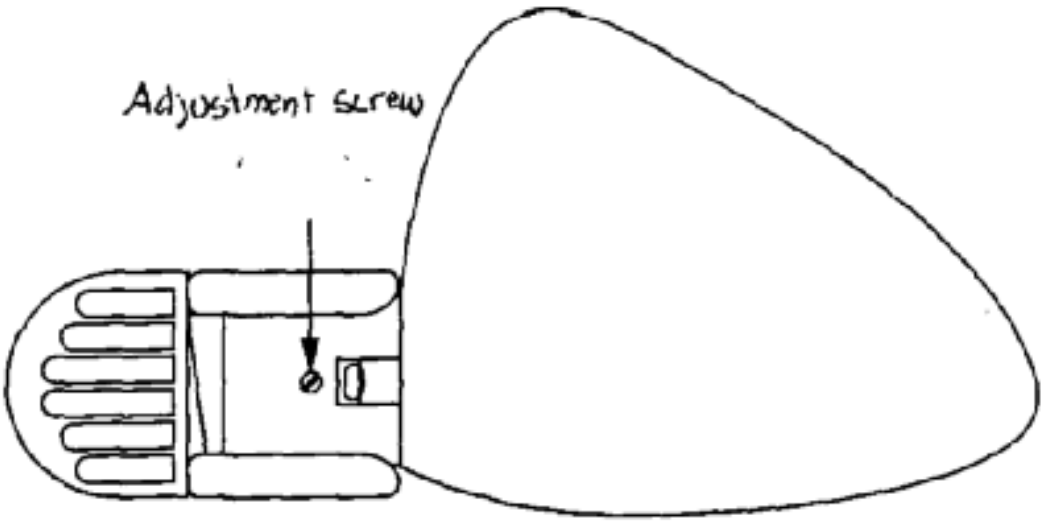
For pasting at the canopy adhesive "Acrificx 92" of Messrs. Roehm GmbH, DW part-no. 11 97 479 may be used.

The shelf life of this adhesive is max. 1 year at 20 °C in original packing.

7.2.2 Adjustment of hand port doors

Both adjustment screws of the hand port door hinge have to be set such that the hand port door fits close to the sealing rubber. The hand port door has to close upon slight pressure and opening in case of heavy tensile load caused by fingers must be impossible. If this is not the case the rubber cone 2M 19524 has to be shortened successively or, if necessary, the latch or front door have to be replaced.

7.2.2.1 Adjustment swiveling windows with adjustment screw



Turn in screw for adjusting the latch so far that the previous closed swiveling window of hand ports opens. From this point turn screw two full turns counter clockwise.

7.3 na

7.4 Height adjustment

The height is adjusted via an motor with spindle. Triggering is done via switches. The motor is equipped with a self-reset-table over-temperature switch.

If the pedestal has to be repaired due to e.g. a defective motor the pedestal has to be replaced completely.

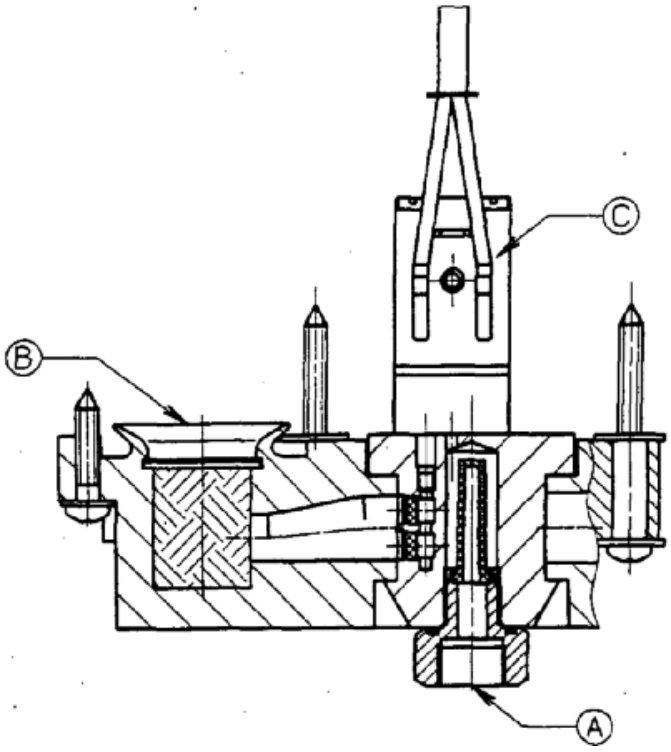
7.5 Valve block (Incubator 8000 IC only)

7.5.1 Arrangement

- valve block without pressure regulator (not USA-Versions)

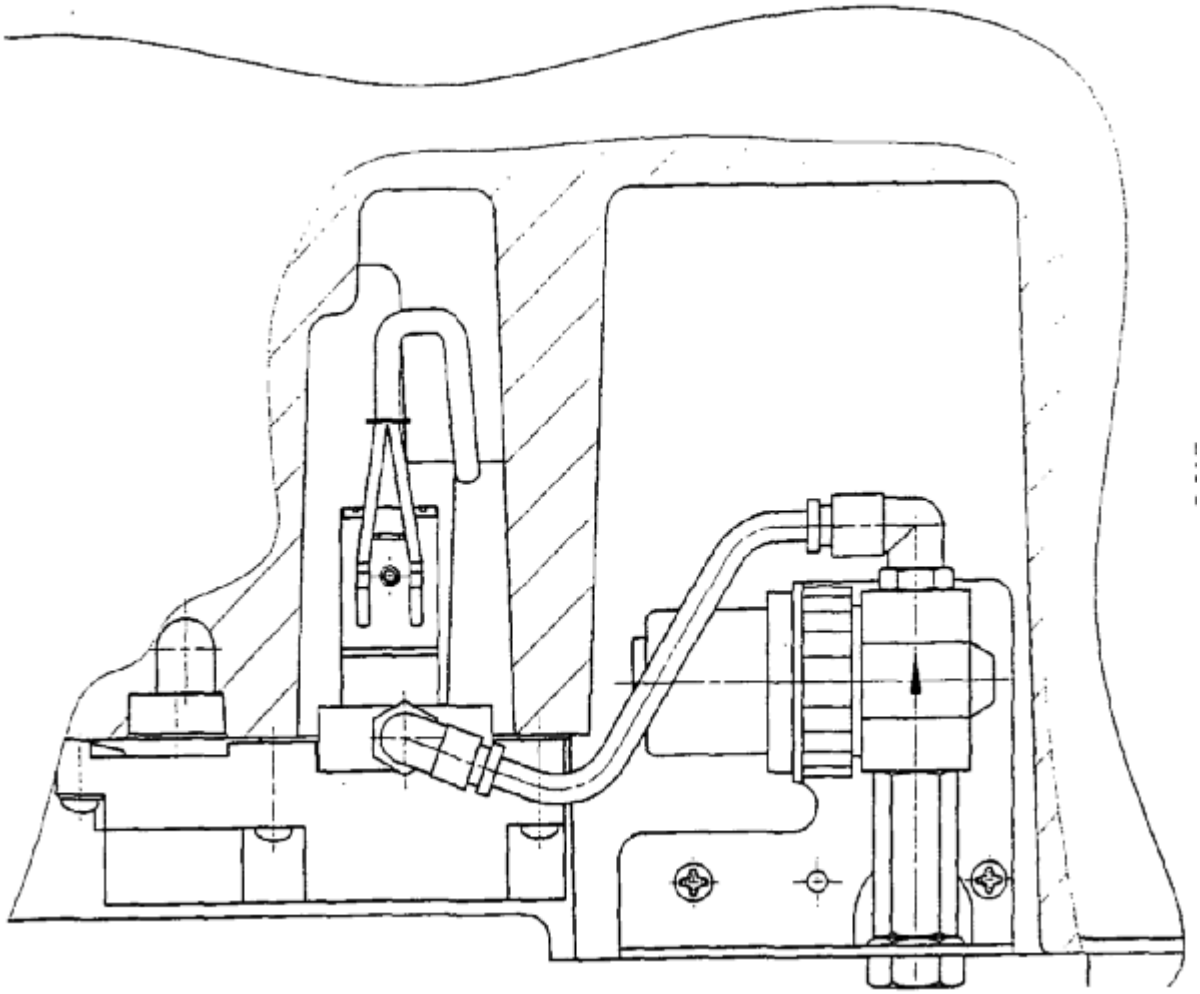
- Valve block with pressure regulator (all USA-Versions and as of 12.92)

7.5.1.1 Arrangement valve block without pressure regulator



A 02 pressure input
B Output to fresh air filter
C Solenoid valve

7.5.1.2 Arrangement valve block with pressure regulator



7.5.2 Exchange of solenoid valve

The solenoid valve can be removed from the valve block after loosening of the two unsecured fastening screws.

7.5.3 Functional test

There are two possibilities for the test:

a) Supply valve with 24 V d.c. voltage for activation

b) The test is carried out in the completely assembled incubator. The valve is activated via software; for this:

- Carry out 02-calibration
- Set desired value Vol. % 02 higher than actual value

7.5.3.1 Tightness of valve

Supply input with 3 - 5 bar 02.
Leak test at output V = 0 L/min.

7.5.3.2 Testing of valve block without pressure regulator (not USA-Versions)

Supply input with 4.8 to 5.2 bar 02 and measure flow at output.

Activate valve:

Test value: Flow = 26 to 30 L/min

Note: The flow is not changed by replacement of the valve because it is fixed due to the proportioning in the valve block. The calibration is done by the manufacturer by reaming of the metering boring in the valve block.

7.5.3.3 Testing of valve block with pressure regulator

Supply input of the pressure transducer with 3 to 5 bar (43.5 to 72.5 psi) 02 and measure flow at output of the valve block.

Activate valve:

Test value: Flow = 29 to 31 L/min

The calibration is done by the pressure regulator.

7.6 Temperature precision adjustment

7.6.1 General Information

The air flow in the incubators of the 8000 series is designed such that the actual temperatures on the bed surface match the temperatures measured by the electronics. The temperature is measured using thermometer 2M 11 111 (Service equipment) placed at 10 cm (1 inch = 2.54 cm) above the center of the bed surface.

Minor deviations may occur resulting from tolerances in the air flow. However, these deviations normally lie within the tolerances specified in the test certificate.

According to the test certificate, a maximum deviation of 1.0 °C for a target value of 36.0 °C is permitted. Upon request, this deviation can be reduced considerably by following the below instructions. The device is shipped ex works with a maximum deviation of 0.8 °C.

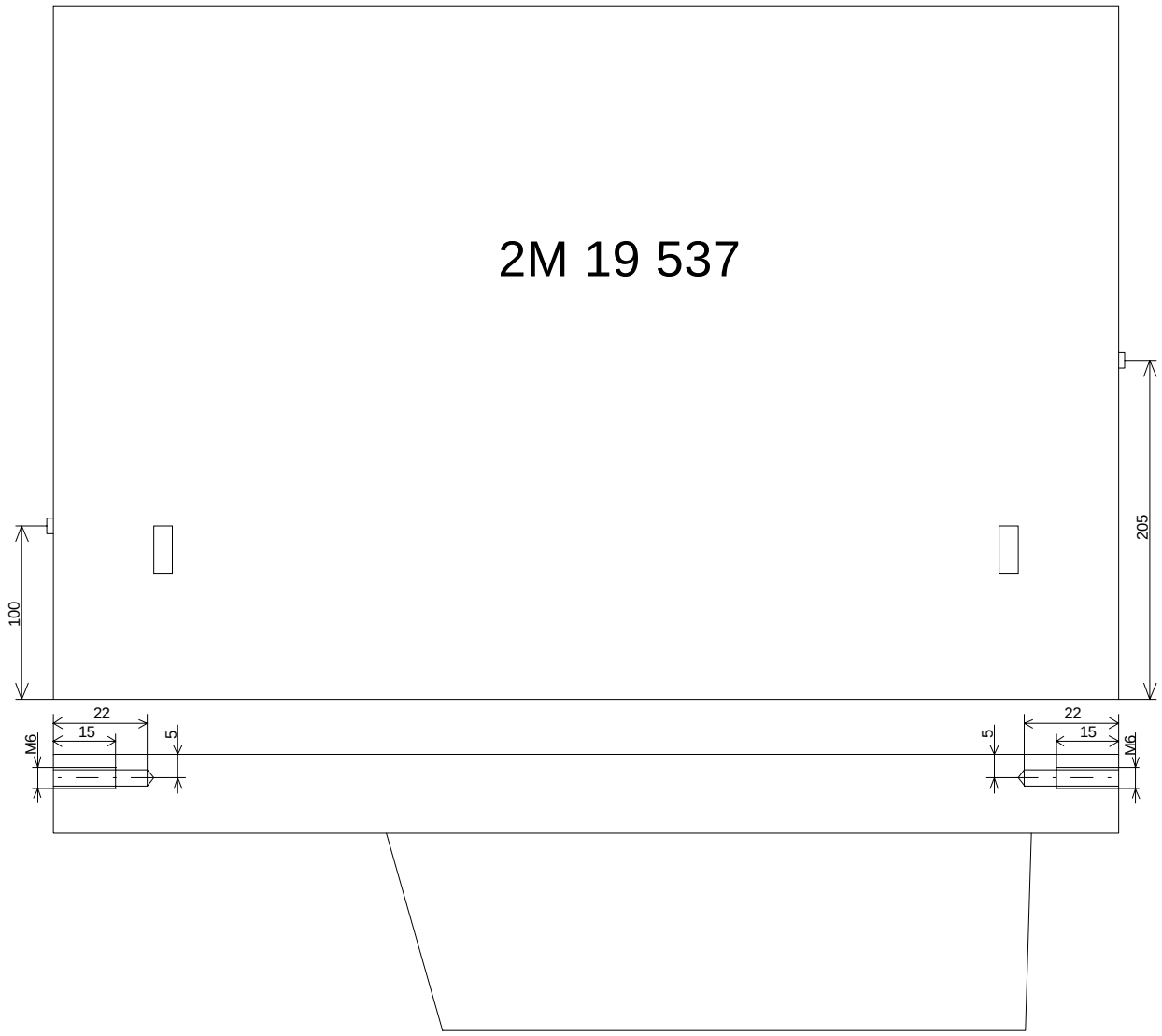
7.6.2 How to influence the temperature

The temperature can be influenced by changing the air flow to the air temperature sensor.

7.6.2.1 Defined fixing of the base 2M 19 537

Using threaded pins it is possible to fix the base 2M 19 537 into a defined position in the trough. These threaded pins are available in devices shipped as of 10/92, older versions can be retrofitted on request. In Incubator 8000 SC/NC this is the only possibility to influence the temperature. In Incubator 8000 IC this method should only-be used if the procedure described under 7.6.2.2 is not successful.

Two polyamide threaded pins M8x16 are shipped ex works. Use hex socket-head threaded pins DIN 915 M6x16 - A2 (13 39 648) for retrofitting. The M6 thread shall be cut only up to taper tap 2 to prevent the screws from rotating during operation. Please note: 1 inch = 25.4 mm.



Calibration:

- Incubator 8000 SC/NC ⇒ see 7.6.4
- Incubator 8000 and 8000 IC ⇒ see 7.6.3

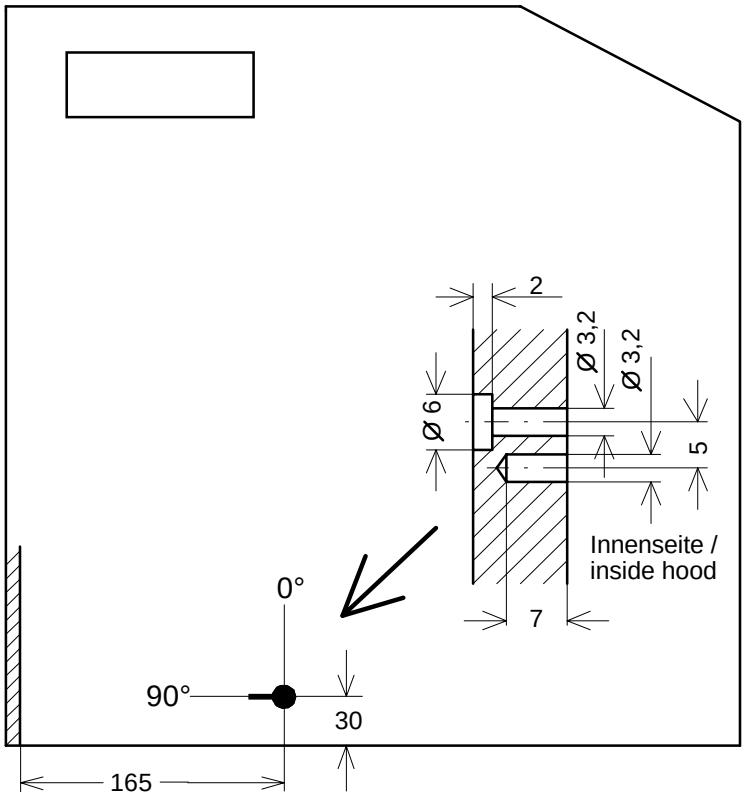
7.6.2.2 Temperature adjustment by a spoiler

The temperature on the bed surface in Incubator 8000 IC can be influenced by a spoiler which is mounted beneath the environmental sensor in the hood. This spoiler will be fitted ex works as of approx. beginning of 1993. Since 1992, it is already available in devices for the US market.

The following items are required for retrofitting:

- Spoiler 2M 20 720
- Self-tapping screw BZ 2,9x16 DIN 7971-A2 13 36 630

Drilling and mounting instructions (1 inch = 25.4 mm):



For calibration in Incubator 8000 IC ⇒ see 7.6.3

7.6.3 Calibration Incubator 8000 IC

7.6.3.1 Requirements

Threaded screws are **available** in the base 2M 19 537 (see 7.6.2.1):

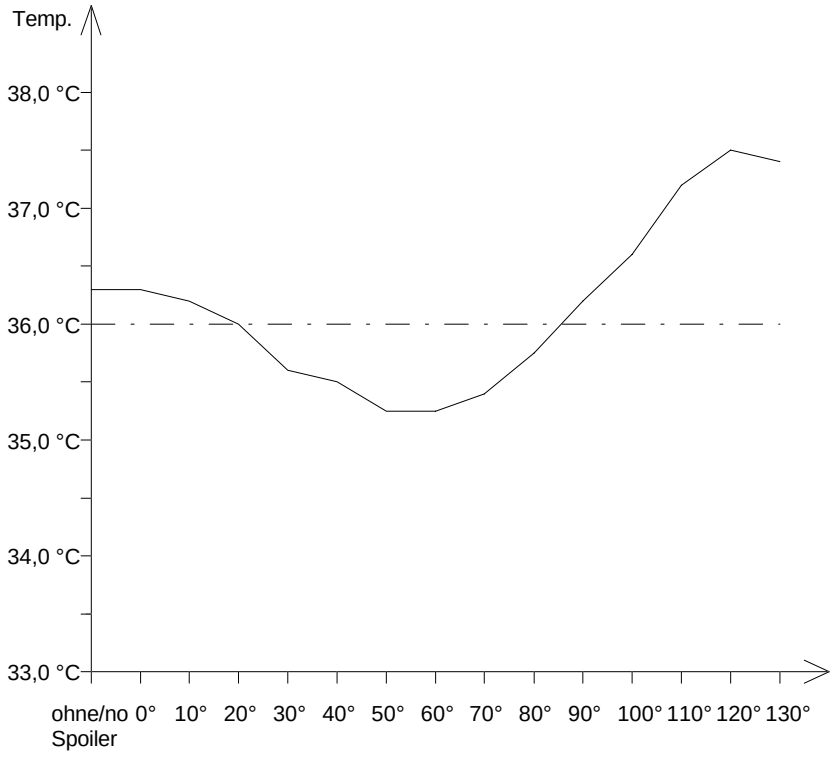
- Screw on lefthand threaded pin evenly, unscrew righthand threaded pin approx. 2 mm until the base is positioned tightly in the trough.

Threaded pins are **not available** in the base 2M 19 537 (see 7.6.2.1):

- Retrofitting of the threaded pins into the base is only necessary if the calibration cannot be carried out using the spoiler.

7.6.3.2 Calibration

The spoiler can be used to adapt the temperature on the bed surface to the temperature displayed on the Incubator. The following temperature influence (target value = 36.0 °C) can be achieved by adjusting the spoiler (mean value of 10 Incubators 8000 IC, base attached to lefthand side). The graph shown below, however, may vary from case to case or shifted downwards if the base is not fixed:



- Preset spoiler according to graph (see drawing under 7.6.2.2).

- The temperature is measured with thermometer 2M 11 111 placed at 10 cm (1 inch = 2.54 cm) above the centre of the bed surface.

- Switch on Incubator and adjust target value of the air temperature to 36.0 °C.

- Allow the incubator to warm up for at least 2 hours.

- Then the temperature on the bed surface can be adapted to the target value by turning the spoiler. After any change carried out on the device or after opening the Incubator wait approx. 20 minutes before performing the next calibration.

- If the spoiler is fitted the deviation should be below 0,8 °C. The maximum deviation allowed according to the relevant test certificate is 1.0 °C.

- If the temperature cannot be achieved using the spoiler then the base must be retrofitted as described under 7.6.2.1. The temperature can be changed by defined fixing of the base in the trough using the threaded pins. The base must be mounted tightly into trough but without being jammed.

- To reduce the temperature ⇒ base to the right

- To increase the temperature ⇒ base to the left

- After opening the incubator to adjust the screws, wait approx. 30 minutes before performing the next calibration.

7.6.4 Calibration Incubator 8000 SC/NC

7.6.4.1 Requirements

Mount threaded pins on base 2M 19 537 as described under 7.6.2.1.

7.6.4.2 Calibration

- The temperature is measured using thermometer 2M 11 111 placed at 10 cm above the centre of the bed surface.

- Switch on Incubator and adjust target value of the air temperature to 36.0 °C.

- Allow the incubator to warm up for at least 2 hours.

- The temperature can be changed by defined fixing of the base in the trough using the threaded pins. The base must be mounted tightly into the trough, however without being jammed.

  To reduce the temperature ⇒ base to the left

  To increase the temperature ⇒ base to the right, temperature overswing might occur during warm-up

- After opening the incubator to adjust the screws, wait approx. 30 minutes before performing the next calibration.

- After calibration the deviation should be < 0.8 °C. Max. 1.0 °C allowed according to the relevant test certificate. The temperature overswing shall not exceed 2 °C.